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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,906	11/07/2005	Andrew Miller Cameron	M02B129	6895
20411 7590 03/16/2009 The BOC Group, Inc. 575 MOUNTAIN AVENUE MURRAY HILL, NJ 07974-2082				
EXAMINER				
YANG, JIE				
ART UNIT		PAPER NUMBER		
1793				
MAIL DATE		DELIVERY MODE		
03/16/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary****Application No.**

10/517,906

**Applicant(s)**

CAMERON ET AL.

**Examiner**

JIE YANG

**Art Unit**

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SE/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/9/2009 has been entered.

### ***Status of the Claims***

Claims 1 and 10 have been amended; and claims 1-21 are pending in application.

### ***Status of the Previous Rejection***

The previous objection of claims 11-13 under informalities is withdrawn in view the applicant's argument/remarks made in an amendment filed on 1/9/2009.

Te previous rejection of claim 10 under 35 U.S.C. 112, second paragraph is withdrawn in view the applicant's argument/remarks made in an amendment filed on 1/9/2009.

The previous rejection of claim 1 on the ground of nonstatutory obviousness-type double patenting over claims 1-3, 5 and 9 of copending application No. 10/512187 in view any one of Curr (US 4,425,223), Higuchi (JP 08-092627) and Yamamoto (JP

62230953) is withdrawn in view of the "Terminal Disclaimer" filed on 11/05/2008 and approved on 11/12/2008.

The previous rejection of claims 1-21 under 35 U.S.C. 103(a) is withdrawn in view the applicant's argument/remarks made in an amendment filed on 1/9/2009. However, upon further consideration, a new ground(s) of rejection is made as following.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 9, and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schlichting (US 5,366,537, thereafter US'537).

Regarding claim 1, US'537 teaches a process for smelting iron ore and /or refining molten iron by oxygen and a carbonaceous fuel (Abstract of US'537) with supersonic speed (Col.3, lines 10-22 of US'537), which reads on the refining ferroalloy by blowing oxygen and metallurgical acceptable particle material with supersonic gas jets as recited in the instant claim. US'537 specifies: "The coal is preferably delivered in a stream at a speed of between about Mach 0.75 and

about Mach 2, surrounded by the nitrogen or argon stream delivered at about Mach 0.5 to Mach 1.5, and the oxygen outer stream is preferably delivered at a speed of about Mach 0.75 to Mach 2.0." (Col.3, lines 14-19 of US'537), which read on the first and second supersonic gas jets as recited in the instant claim. The speeds of gas jets overlap the velocities of the first and the second supersonic gas jets, which is a prima facie case of obviousness. SEE MPEP 2144.05 I. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed velocity of the second supersonic gas jet being from 10% less to 10% greater than the velocity of the first supersonic gas jet from the disclosures of US'537 because US'537 discloses the same utility throughout the disclosed ranges.

Regarding claim 9, US'537 teaches charging metallurgical acceptable material, for example carbonaceous material including of coal, coke, graphite, char, and hydrocarbon gases or liquids (claim 8 of US'537); or charging in the form of solid plugging (Col.6, lines 10-22 of US'537), which reads on the limitation of introducing metallurgical acceptable particular material in fine particular form as recited in the instant claim.

Regarding claims 11-14, US'537 teaches inert gas flow and oxygen gas flow (Col.2, line 39 to Col.4, line 60 of US'537),

which reads on the oxidizing gas (claims 11, 12, 14) and non-oxidizing gas (claims 11 and 13).

Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over US'537 in view of Fritz (WO 0012767 used hereinafter with US 6,558,614, US'614).

Regarding claim 15, US'537 specifies: "The coal is preferably delivered in a stream at a speed of between about Mach 0.75 and about Mach 2, surrounded by the nitrogen or argon stream delivered at about Mach 0.5 to Mach 1.5, and the oxygen outer stream is preferably delivered at a speed of about Mach 0.75 to Mach 2.0." (Col.3, lines 14-19 of US'537), which overlap the velocity of Mach 1.5 to Mach 4 of the first nozzle and the second nozzle as recited in the instant claim.

Still regarding claim 15 and claims 16-18, US'537 teaches co-axial different streams (Fig.5-6, Col.6, line 60 to Col. 7, line 26 of US'537), but US'537 does not specify the use of Laval nozzles in the supersonic jet streams. US'614 teaches a method for producing a metal melt involving the charging of solid metal oxides and a lance for use in the described method. US'614 teaches a lance comprising a first axial gas supply tube terminating at its outlet wherein the mouth part of the tube is designed as a first Laval nozzle, a second tube surrounding the

first tube terminating at its outlet, wherein the mouth part of the tube is designed as a second Laval nozzle, and a third tube for forming a supply duct, in particular for solid, fine grained to dust-like substances, wherein the outlet of the third tube is in a divergent part of the first Laval nozzle. The Laval nozzle facilitates high velocities (Col.1, lines 5-15; Col.5, lines 6-14; Col.7, lines 18-23; and Fig.5 of US'614). It would have been obvious to one of ordinary skill in the art to combine process taught by US'537 and the lance of US'614 in order to facilitate the refining of a ferroalloy in term of speed (i.e. shorter processing time). Regarding the combustion chamber in the instant claim 18, US'614 teaches a cavity formed at the end of the lance seen in Fig.5 allows for the combustion of the fuel and oxygen (Fig.5 and Col.5, lines 5-24 of US'614)

Claims 2-8, 10, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over US'537 in view of Edlinger (US 6,409,793 B1, thereafter, US'793).

Regarding claim 2, US'537 does not specify that the metallurgical acceptable material includes metals for example refined alloy, alloys of said metals, oxides of said metals, and mixtures thereof. US'793 teaches a method for producing steel slags containing chromium (title and Abstract of US'793). US'793

teaches chromium ores or chromium-containing dusts are top blown onto the bath via a hot blast lance by the aid of jet of suitable speed (Col.2, lines 13-30 of US'793). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the chromium-containing dusts as taught by US'793 in the process of US'537 in order to obtain high-grade ferrochromium alloy (Abstract of US'793).

Regarding claim 3, US'793 teaches that the high grade metal include 35wt% Fe (Col.4, lines 30-37 of US'793), which is within the at least 30wt% Fe range as recited in the instant claim.

Regarding claims 4-7, the chromium-containing dusts (Col.2, lines 13-30 of US'793) read on the chromium-containing metallurgical acceptable material as recited in the instant claims.

Regarding claim 8, US'793 teaches that the chromium ore includes 5.3wt% MgO, which reads on the oxide of manganese acting as metallurgical acceptable material as recited in the instant claim.

Regarding claim 10, US'793 teaches that the particle sizes of below 4mm, preferably 0.5-2mm, which overlaps the particle size of 1 mm or less as recited in the instant claim.

Regarding claims 19-21, US'793 teaches followed by ensured rapid mass transfer, suitable postcombustion will be applied



(Col.2, lines 13-31 of US'793). US'793 teaches that in order to ensure the appropriate postcombustion, the hot blast is enriched with oxygen (Col.2, lines 31-33 of US'793), which reads on the limitation of first introducing metallurgical acceptable material (claim 19); then introducing oxygen by gas jet (Claim 20); and finishing the refine operation (claim 21).

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JY

/Roy King/  
Supervisory Patent Examiner, Art Unit 1793